

**Amendment:** Cancel all claims of record and substitute new claims 32 to 34.

32. Memory device comprising:

- a. a resistive layer with a plurality of solid electrolyte elements and a metallic layer, or
- b. a lamination of said resistive layer, said metallic layer and a conductive layer.

33. The device of claim **32** wherein said resistive layer is a layer with a plurality of solid electrolyte elements embedded in an insulator layer.

34. The device of claim **33** wherein the size of solid electrolyte elements is in the range of about 1.0-50 nm.

#### **REMARK-General**

Applicant has rewritten all claims to define the invention more particularly and distinctly so as to overcome the technical rejections and define the invention patentably over the prior art.

**Claim rejections-35USC 103**

*Claim 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kozicki et al (6,084,796).*

*For the purpose of this rejection, the resistive element such as a chalcogenide phase change memory as described in the specification in paragraph 019, lines 2-3 and the memory element including an ultra small resistive layer as described in the specification in the paragraph 023, lines 6-7.*

**Applicant has withdrawn the content about phase change memory in the new specification. There is no claim about the phase change memory in claims 28-31.**

*With respected to the independent claim 28, Kozicki et al in Figure 1A-1B and Figure 5C discloses a programming metallization cell memory (10) comprising:*

*A pair of electrodes (13, 14 in Figure 1A-1B and 253, 254, 260, 262 in Figure 5C);*

*A thin metal layer (metal 15, example, when the metal 15 which is apply the voltage for removed the electrodes 13, and 14, see column 6, line 5-9)*

A single resistive layer (resistive 270, for example, 270 is a resistive material layer as shown in Figure 5C, see column 8, line 50-58) with plurality of solid electrolyte (ion conductor 12 in Figure 1A-1B including a solid electrolyte, see column 5, line 18-19).

**Applicant look the patent 6,084,796 for above (column 8, line 50-58; column 5, line 18-19) statement, but does not find any description about a resistive layer with plurality of solid electrolyte. Applicant requests the examiner to reconsider above statement.**

However, Kozicki et al does not teach an ultra small resistive element. Gonzales et al in Figure 15 disclosed the extra-small pore is the fabrication utilized of the chalcogenide memory cell (see column 6, line 66-67 and column 7, line 1-5).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify Kozicki et al using an ultra-small resistive element such as chalcogenide memory cell with minimum dimensions and reducing the required energy input to the chalcogenide

*in the programming metallic cell as taught by the Gonzalez et al.*

**In new claims 32-34, there is no claim about the electrode and thin metal layer. The amended specification and claims 32-34 are about a new PMCM memory structure with multiple small electrolyte elements.**

*With respected to dependent claim 29, Kozicki et al, in Figure 1B disclosed the top and bottom surface (.....) which is contact direct with the adjacent metal layer and bottom electrode.*

*With respected to dependent claim 29, Kozicki et al, in Figure 1A-1B disclosed top and bottom surface (electrode 13 and 14 disposed at the surface of the ion conductor including the electrolyte resistive element (12)) which is contact direct with the adjacent of conductor layer and thin metal layer.*

**Applicant requests reconsideration and withdrawal of this rejection for following reasons:**

**Claim 30 is about the laminated PMCM structure and describes the sequence of the each layer. This structure is different from the Kozicki's structure in Figure 1A-1B where only tri-layer structure was disclosed.**

*Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kozicki et al. (6,084,796) in view of Yadav et al (US. 6,387,560).*

*With respected to dependent claim 31. Kozicki et al. In view of Gonzalez et al. disclose in a PMCM above, e.g. Kozicki et al in Figure 1A-1B and Figure 5C discloses a PMCM (10) comprising: a pair of electrodes (13, 14 in Figure 1A-1B, and 253, 254, 260, 262 in Figure 5C; a thin metal layer (metal 15, example, when the metal 15 which is apply the voltage for removed the electrodes 13 and 14, see column 6, lines 5-9); a single resistive layer (resistive 270, for example, 270 is a resistive material layer as shown in Figure 5C, see column 8, lines 50-58) with plurality of solid electrolyte (ion conductor 12 in Figure 1A-1B including a solid electrolyte, see column 5, lines 18-19); and Gonzalez et al in Figure 15 disclosed the ultra-small pore in the fabrication utilized of the chalcognide memory cell (see column 6, line 66-67 and column 7, line 1-5).*

*However, Kozicki et al. in view of Gonzalez et al. does not disclose the size of the solid electrolyte range about the 1-100 nm in diameter.*

*Yadav et al. disclosed an ion conducting solid electrolyte which is grain size has been confined to dimensions less than 100 nanometers. (see column 6, line 3-7).*

*It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the PMCM of Kozicki et al in view of Gonzalez et al to include a size range of solid electrolytes base on ion defect structure as in Yadav et al for the purpose of easily and change the properties of the material.*

**Applicant requests reconsideration and withdrawal of this rejection for following reasons:**

**Claim 31 define the size of the multiple ultra small electrolyte elements in the disclosed invention. Kozicki et al only disclose the structure of the PMCM(10) in Figure 1A-1B and Figure 5C, but does not teach the size of the electrolyte and the memory with plurality of solid electrolyte. In general, a PMCM memory unit includes one electrolyte element. As to the invention of Yadav et al.**

Yadav et al. discloses a nano-structured electrolyte material used in the sensor detecting gas. It is a pressed powder bulk material, instead of thin film. The grain size described in column 6, line 3-7 is the powder size. The material disclosed by Yadav et al. is a uniform material which is completely different from the composite-phase structure in applicant's invention.

### **Conclusion**

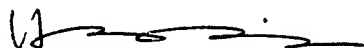
For all of the above reasons, applicant submits that the specification and claims are now in proper form, and that the claims all define patentably over the prior art. Therefore he submits that this application is now in condition for allowance, which action they respectfully solicit.

### **Conditional Request for Constructive Assistance**

Applicant has amended the specification and claims of this application so that they are proper, and define novel structure which is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, applicant respectfully request the

constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. § 2173.02 and § 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,



Hai Jiang

**Attachments:**

1. **Appendix I: Amendment of the specification**
2. **Appendix II: Amendment of Figures 1-6.**
3. **SB-122 form: Address change**

**Certificate of Mailing:** I certify that on the date below this document and referenced attachments, if any, will be deposited with the USPS as express mail (Label #: ER 839840657 US) with proper postage affixed in an envelope addressed to "Commissioner for Patents, Alexandria, Virginia 22313-1450"

Sept. 13, 2005



(Hai Jiang)